provisional acceptance of these results. It may confidently be expected, however, that further research along similar lines, with a study of spontaneous atherosclerosis, especially in carnivorous animals, both wild and domesticated, and its comparison with the human, together with the experimental investigation of the effect of bacterial infection and of toxins on other animals besides rabbits, will materially assist in advancing our knowledge and throwing some light into much that is still very obscure.

THE BACTERIOLOGY OF THE PUERPERAL UTERUS.

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The germ content of the uterus has been controversial ground for years. The question has been investigated by many since the time of Doederlein with the most varied results, to be explained, in our opinion, upon the ground of errors in technique. Probably the earliest investigator in this field was Myerhofer, who, in 1865, employed suction by means of a glass tube. He was always able to demonstrate cocci and bacilli if the case were febrile, but he did not find them in afebrile cases. Doederlein, in 1887, reported a series of 30 cases with normal temperature. In 27 of these the lochia was sterile, while in 3 bacilli were present, streptococci being identified once. He drew the conclusions from his study: (1) That in normal cases the uterine lochia is sterile; (2) that microörganisms are almost always present in severe cases of puerperal infection; (3) that infection is not always due to lack of care on the part of the physician. Von Ott and Czerniewski, in 1888, arrived at the same conclusions, but the latter held that the streptococcus might be present in the lochia of normal cases in rare instances without symptoms.

In contradistinction to the above, we wish to call attention to the statistics contributed by Stolz, who found streptococci in the vaginal secretion of three normal pregnant women, while in a series of women with abnormal vaginal secretion during pregnancy streptococci were present in several instances. In studying the puerperal uterus, he found that on the ninth day, in a series of 156 cases examined during labor, with aseptic precautions, there were 55 positive and 101 negative results, streptococci being found in 11 per cent. of the positive cases.

Neither the duration of the labor, the presence of laceration, the number of examinations during labor, or the operations performed to effect delivery seemed to alter the result. Retention of secundines did, however, increase the bacterial content. In 54 women who had not been examined in labor, and in whom the puerperium was normal, he found that in 10, cultures gave streptococci on the ninth day. In a series of over a dozen women in whom cultures were taken on the third, fourth, fifth, sixth, seventh, and eighth day, in order to determine the time of ascendancy of the germs, it was found that early in the puerperium there might be non-pathogenic organisms in the lochia with absence of any signs of infection; that the puerperium from the third day on did not differ in germ content from the later period (ninth day); that the content on the ninth day was less on the average than earlier. Therefore, he believes that in the latter days of the puerperium the uterus cleanses itself from organisms in a large proportion of cases. As his cases were not selected, there occurred a series of 18 in which, one or more days after the culture, there was a development of fever. In this febrile series, with the exception of 5 cases, there had been found a growth in culture before the appearance of the fever, and in half of the positive findings streptococci were demonstrated. In cases in which, on the earliest culture, streptococci were present, there cannot be a question of having caused the fever by infection at the time of culture, according to the opinion of the author. Doederlein and Franz also conclude that in cases of streptococcic vaginal lochia the taking of a culture is not a harmless experiment, but that the infection is sometimes to be laid at the door of the culture. Doederlein declared that the initial period of freedom from symptoms before the taking of the culture could be explained by the incubation of the organisms, but Stolz denies this. However, he does not deny that the presence of streptococci in the cavum uteri may be the cause of the development of fever, without other reason than the trauma necessitated by the culture. He makes the point that the danger is much less if the culture be taken late in the puerperium, and states that he has never seen any difficulty if he has not cultured in the early days. In studying the examination of the lochia and vaginal secretions on the fourth day, he used a series of 75 cases for the uterine lochia and 65 cases for the vaginal secretion. He found that the uterine lochia was positive in 80 per cent. and that in 36.9 per cent. streptococci were present, while the vaginal secretion in 27 per cent. gave streptococci. Both these series were entirely normal cases. He concludes as follows in regard to the findings of the fourth day: (1) That the vagina always contains organisms, and the uterus does so in a large proportion of cases; (2) that the presence of streptococci in either situation is possible without symptoms; (3) that the uterus contains fewer germs in unexamined cases than in those examined, but streptococci are to be found in both uterus and vagina in some unexamined cases; (4) that examination with sterile hands during labor has no apparent influence upon the germ content; (5) that aseptic glove operations have no distinct influence; (6) that no actual increase in germ content appears to be dependent upon the duration of labor, but that streptococci are relatively increased.

Finally, we would quote rather extensively from the paper of Little, which appeared while this paper was in preparation. Little came to the following conclusions: (1) Cultures taken immediately after labor are sterile in 92 per cent., or in 96 per cent. if gonorrheal cases be included; bacteria may be present exceptionally, even in the absence of vaginal examinations during labor, and the puerperium may be normal; the bactericidal power of the blood serum may be the cause of a certain number of negative results. (In 10 of his 50 cases it was necessary to introduce the hand into the uterus, and it is impossible to believe that no organisms were carried into the cavity. Of course, the downward flow after labor may also be a reason for negative findings in these cases.) Upon the third day he found sterility present in 62.5 per cent. of 40 afebrile cases, as compared with 40 per cent. sterility in 10 cases in which the temperature reached 100.6° or higher. (2) That the inclusion of cases in which gonococci were demonstrated will increase these averages to 85 per cent. and 50 per cent., respectively. (The author calls attention to the fact that he has included in his febrile series cases in which the temperature rise was obviously not due to any intrauterine cause, and the lochia, being sterile in these cases, or at least in some of them, a decrease in the percentage of the negative results is caused in the afebrile series and of the positive results in the febrile.) (3) That the finding of bacteria in the cervical canal at the completion of labor does not necessarily imply their presence later in the puerperium. (In one instance, in which there was a flaw in the tube, the author found a positive result in the first culture, but a negative one the third day, and admits that this was due to contamination with cervical secretion.)

Conclusions based on the cultures made on the seventh day postpartum were as follows: (1) Absolute sterility in 50 per cent. of the afebrile cases, as compared with 20 per cent. of the febrile. (2) Inclusion of gonococci makes these averages 80 per cent. and 50 per cent., respectively. (3) Bacterial findings differ more markedly according as the case is febrile or afebrile than by clinical characteristics. (In 5 of this last series positive results were obtained in cases which had been sterile at both previous cultures.

From 3 of these 5 cases a diplococcus was obtained which resembled, and was probably identical with, the diplococcoid forms so frequently observed in the cervix and vagina, and the author thinks it may have been due to contamination, since he admits that it is impossible to get an absolutely trustworthy result by his method at this stage. In the 2 remaining cases the organisms were gonococci.) It is to be noted that in 20 cases showing bacteria on the seventh day of the puerperium the gonococcus was the organism in 12, and, further, that only 2 of the 10 febrile cases had sterile lochia on the seventh day; the streptococcus found in one instance on the third day had disappeared on the seventh day. (4) The uterus has the power of self-cleansing, and so the presence of organisms on any day of the puerperium does not mean their continued presence, and the author believes that the results given by Stolz, who found fewer organisms late in the puerperium that an at earlier period, are to be thus explained.

The gonococcal findings in his complete series of cases were demonstrated in 2.5 per cent., 25 per cent., and 30 per cent., respectively, on the first, third, and seventh days. His general conclusions as regards the effect of interference during labor are as follows: (1) Laceration of the cervix and the perineum have no bearing upon the germ content of the lochia; and (2) vaginal examinations have but slight effect (4 out of his 6 afebrile cases not examined during labor showed bacteria in the lochia, Bacillus coli communis being found once and the gonococcus three times; while 1 afebrile case was examined six times in labor and no organisms were ever found in the lochia.)

Operations to effect delivery resulted in this series as follows: In his febrile series there was one woman who had been delivered by forced accouchement who showed gonococci in the lochia; while a second one, upon whom version had been performed, was the case of streptococcic infection. There were 8 others operated upon in the series, and of them, 3 were positive (version, low forceps, and induced labor, of each, 1 case); 3 other cases showed gonococci (2 low forceps and 1 bag induction); of 2 cases, 1 gave on the third day a variety of Bacillus dysenteriæ, while the other gave Micrococcus aureus and Bacillus pseudodiphtheriæ on the seventh day (the first was a midforceps operation, and the latter a case of version). The former of these last 2 is considered to have been a contamination at the time of culture.

General Conclusions.—In 50 cases studied by Little the uterus was found to be sterile in 92 per cent., 50 per cent., and 44 per cent. on all three days. If gonococci be included, the above averages are 96 per cent., 72 per cent., and 67 per cent. The puerperium is to be noted as normal in 40 and febrile in 10 cases of this series. In the normal cases there was absolute sterility in 92.5 per cent., 62.5 per cent., and 50 per cent., as compared with the febrile series, in which 90 per cent., 40 per cent., and 20 per cent. were found to be sterile. Including the gonococcic cases, these latter figures would be 95 per cent., 85 per cent., and 70 per cent., and 100 per cent., 50 per cent., and 50 per cent. The author considered his results as positive if bacteria were found only in smear preparations or only in cultures, as well as when present in both. It is likely, therefore, that a certain number of positive results were due to contamination and that the uterus is really sterile in a larger number of cases than these percentages would indicate. Streptococcus was present but once—a febrile case, on the third day; absent, however, on the first and seventh days. Finally, for purposes of completeness, the following schedule of results is worth including, this being taken from Little's article:

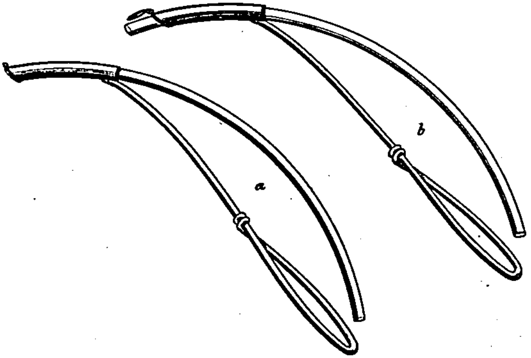
						Per cent.
Von Ott	in	9	cases	found lochia	sterile in	100
Czerniewski	"	57	"	"	"	98
Doederlein	"	30	"	"	"	90
Doederlein	"	250	"	"	"	83
Vogel	"	15	"	"	"	80
Franque	"	10	"	"	"	80
Kronig	"	63	"	"	"	79
Thomen	"	9	"	"	"	66
Walthard	"	20	"	"	"	65
Stahler	"	55	"	"	"	64
Franz	"	10	"	"	"	0
Burckhardt	"	14	"	"	"	7
Stahler	"	19	"	"	"	16
Wormser	"	100	"	"	"	16
Stolz on the fourth day				"	"	19.6
Vogel	in	15	"	"	"	34
Schauenstein	"	100	"	"	"	36
Stolz on the ninth day				"	"	65

The importance of definite and certain knowledge on this whole question cannot be overestimated, because of its bearing upon the general question of puerperal septic infection and more particularly upon the frequency of auto-infection. If some investigators are correct in their findings of pathogenic organisms in a great proportion of normal cases after delivery, it is very evident that the value of this method as an aid to diagnosis is nothing; and, moreover, that auto-infection is one of the most common causes of puerperal sepsis, instead of being, as is the general opinion at present, one of the most rare happenings. Even if the extreme position of Stolz with regard to the frequency of positive findings be found untenable, proof that the ascent of organisms after the first few days into the cavity of the uterus is a usual or even a moderately frequent event will render useless any further consideration of this matter, since the import of positive findings in any given case will be beyond determination.

The probability that streptococci would be satisfied to act as saprophytes within the uterine cavity after delivery being to us a matter of grave doubt, together with the fact that in normal cases, used for demonstration of the method before the class, the laboratory reported pure streptococcic cultures, turned our attention forcibly to the question of the technique employed in the clinic for the collection of the lochia. It being a matter of common knowledge that the lower vagina in most cases is the seat of bacterial activity, and that in a goodly number the same condition prevails in the cervix and upper portion of the vagina, we felt that the method employed, while as careful as any then known to us, demanded modification if it was to be worth doing at all. At this time the ordinary Doederlein tube was employed, sterilized by boiling, and its introduction was performed with the usual aseptic precautions. Realizing that introduction without contamination from the cervix was certainly impossible, if done several days after delivery, and that it was improbable at any time, it was assumed that a positive culture obtained in a normal case simply meant that there was bacterial growth somewhere below the internal os uteri; while those in which this method gave negative results simply gave evidence of both a sterile endometrium and an absence of contamination in the vagina and cervix. Our attention, therefore, was directed toward a modification of the technique which would render possible the collection of uterine lochia without the risk of contamination from the lower canal.

After some experimentation it was decided that there had been several weak points in the technique which we had been in the habit of using, and the method upon which the present findings are based was evolved. Its most important element (see figure) is the use of a slightly curved cervical speculum, the distal end being closed by a hinged cap. A handle of convenient length is attached to render its introduction more easy. We do not claim originality for this idea, as, although at the time the fact was unknown to us, various forms of protective specula have been employed by others. We believe that our instrument will be found to be the simplest as well as the most trustworthy. To enable us to use the speculum, we discarded the typical Doederlein tube and adopted one with a uniform curve and of small caliber, easily obtained from any manufacturer.

The method in detail is as follows: The patient is placed in the lithotomy position and the external genitalia are carefully cleansed with tincture of green soap, water, and mercuric bichloride. A Sim's speculum is inserted, the cervix is grasped by a double tenaculum, and its vaginal portion cleansed with cotton and bichloride solution. The metal tube, with cap closed, is then inserted into the uterine cavity. This tube is sterilized by pressure and wrapped in two coverings, in order that the operator may remove it from the inner one without contaminating his hands. The glass tube is placed within the metal one before sterilization and is not removed from the latter until the culture has been completed. The cap is opened by pushing the glass tube into the cavity of the uterus, a piece of sterile rubber tubing is attached to the proximal end of the glass tube, and as much lochia as possible is sucked into the glass tube by means of a hard rubber syringe. The glass tube is then withdrawn until its distal extremity is engaged within the metal tube and then both are simultaneously removed from the patient. The ends of the glass tube are sealed with wax and the tube is sent to the laboratory. The points of paramount importance, in our opinion, are the presence of the cap upon the distal end of the sheath tube and the sterilization of the tubes by pressure instead of by boiling. We also feel that the simultaneous introduction of both tubes is very important and that their simultaneous removal is but little less important.



Curved cervical speculum for taking intra-uterine cultures: *a*, tube with cap closed ready for insertion; *b*, after insertion, showing the open cap and the projected inner tube for collecting the secretions.

As important as the collection of the uterine lochia is the technique employed in the laboratory. The danger of outside contamination, especially from the tube itself, must be recognized. For this reason the tube was washed with a bichloride solution, the ends broken off, and the contents placed in a sterile Petri-dish, cultures being made from this upon the following media: (1) Agar-agar stroke plates; (2) glycerin agar stroke plates; (3) serum agar stroke plates; (4) bouillon tubes; (5) litmus milk tubes for anaërobic cultures by Wright's method; (6) glucose agar for anaërobic cultures. In addition, cover slip preparations were made, two being stained with Löffler's stain and two with Gram's stain.

At times this routine method was deviated from because of the lack of serum agar. This medium was used for the demonstration of the gonococcus. It has been our experience in studying the gonococcus that in the secretions in which the organism could not be demonstrated microscoically no growths occurred upon the special medium used for its cultivation, and that often it could be found in the stained specimen without growth upon the artificial medium, owing to the overgrowth of a mixed culture. For this reason we do not believe that our results as to the presence of the gonococcus are vitiated by the occasional omission of this form of medium. In this series the presence of the gonococcus was remarkably infrequent. We believe this to be due to the technique, which eliminated cervical contamination and proved conclusively to our minds an already formed opinion that gonorrheal endometritis is a much rarer condition than is generally thought. We do believe, however, that this organism is present and persists for a long time in the cervix, often acting as the forerunner of septic infection. Two of the cases in this series showed the presence of the gonococcus; the streptococcus was also found. The frequency with which the gonococcus has been found by other observers we believe to be due to cervical contamination.

In determining the qualifications of a normal case, we have differed from some of the other investigators in this field. We have taken no note of lacerations of either the cervix or the perineum, the duration of the labor, the number of vaginal examinations, the parity of the woman, or the presence of evanescent temperature, unless the latter has been shown clearly to be dependent upon pathological conditions in the generative tract. In other words, we have classified a case as normal if there has been no instrumental interference in labor, if the hand has not been introduced into the uterus, if gauze has not been introduced into the uterus or vagina, and if no douches have been given, if there has been no retention of considerable portions of the placenta or membranes, and if no alteration of the odor or appearance of the lochia has occurred. In short, we use the term normal as descriptive of the most common parturient state. We believe that by so doing we are likely to reach more valuable conclusions than by more closely restricting ourselves in our selection of cases for study, since the important fact for determination is the bacterial content of the uterus in the type of case most usually met with in actual practice.

With regard to the value of the intra-uterine culture as an aid to diagnosis, we feel that it is a method which should not be neglected in the routine study of infected cases, at least in institutions having the advantage of well equipped laboratories of bacteriology. The technique as regards asepsis is more exacting than that required for successful blood culture, since the vagina and cervix, with their bacterial flora, must be traversed in obtaining the intra-uterine culture. If a suitable technique be followed, we are confident that the results, as a whole, will well repay the time spent in the procedure; but we do not desire to be understood as affirming our belief that the method is, as it was formerly thought, a sovereign means of diagnosticating the presence or absence of infection in all cases. We have, for instance, four records not included in this paper, in which in cases afterward proved to be septic, the intra-uterine findings were negative. That such an occurrence will take place as a matter of course, more or less often in a series of examinations of septic cases, must be evident to anyone who will consider the varied manifestations of septic processes during the puerperium. On the other hand, the relative rarity of this negative finding in the presence of septic infection offers valuable evidence as to the general utility of the method.

Taken in connection with the studies upon the bacteriology of the blood which have been made in our clinic, we feel justified in making the following statements: (1) If both blood and intra-uterine cultures are negative, the temperature is due to some intercurrent condition; (2) if the intra-uterine culture is positive, but the blood culture is negative, we consider the infection to be still local in its manifestations; and (3) if the intra-uterine culture is negative but the blood culture is positive—a very unusual condition—we are justified by our general conclusions in considering that the case is one of general infection, the local endometrial condition having been either sterile from the first or having become so gradually after the general infection developed.

It will be noted that we have classified 6 cases as normal which have given cultures in the lochia, and that we have explained the growth in them by errors in technique. We feel that this demands a fuller explanation in order that we may be entirely intelligible. It is necessary that it be clearly understood in the first place that these 6 cases do not include by any means all the cases in which there was a departure from the method described in the first part of this paper. In each instance any such departure was noted at the time the culture was made, and these are the only cases associated with technical error in which a growth was obtained. In the greater number of cases, however, in which accidental departures from the technique occurred, without cultural results, the variation was trivial, being simply noted for reasons of scientific accuracy. In the 6 cases mentioned the variations in the method were of a nature to give expectation of the probability of vaginal or cervical contamination. It is also quite true that the same, or as grave, errors were made in a few cases which did not show positive results in the culture; and this emphasizes our claim that, while a technique as rigid as ours may not aways be necessary to obtain satisfactory results in each individual case, still, if error has been made in technique, it is manifestly unfair to consider positive findings as evidence of intra-uterine infection.

NORMAL CASES—CULTURES TAKEN IN THE FIRST, SECOND, AND THIRD PERIODS.

Number.	Case number.	First period: First to third day.			Second period: Fourth to seventh day.			Third period: Eighth to thirteenth day.			Remarks.
		Aërobic.	Anaërobic.	Microscopic.	Aërobic.	Anaërobic.	Microscopic.	Aërobic.	Anaërobic.	Microscopic.	
1	1	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Normal.
2	2	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Normal.
3	5	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Normal except for one temperature of 102° on the sixth day (a few hours after culture) falling at once to normal.
4	7	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Normal.
5	25	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Student introduced hand into vagina to deliver placenta; otherwise a normal case. On third culture three attempts made before tube passed.
6	56	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Normal.
7	57	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Normal.
8	58	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Normal.
9	61	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Normal.
10	62	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Dead foetus delivered at home: otherwise normal.
	34	See error in technique.			Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Labor normal. Error made at first culture—whereby vaginal secretion obtained.

NORMAL CASES—CULTURES TAKEN IN THE FIRST AND SECOND PERIODS.

11	13	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	....	....	....	Normal. Febrile temp. once because of congested breasts.
12	27	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	....	....	....	Normal. One febrile temp.
13	28	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	....	....	....	Normal.
14	41	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	....	....	....	Normal.
15	42	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	....	....	....	Normal.
16	43	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	....	....	....	Normal.
17	65	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	....	....	....	Normal.
18	6	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	....	....	....	Normal.

NORMAL CASES—CULTURES TAKEN IN THE FIRST AND THIRD PERIODS.

19	9	Sterile.	Sterile.	Negative.	....	....	....	Sterile.	Sterile.	Negative.	Normal.
20	14	Sterile.	Sterile.	Negative.	....	....	....	Sterile.	Sterile.	Negative.	Normal.
21	15	Sterile.	Sterile.	Negative.	....	....	....	Sterile.	Sterile.	Negative.	Normal.
22	23	Sterile.	Sterile.	Negative.	....	....	....	Sterile.	Sterile.	Negative.	Normal.
23	59	Sterile.	Sterile.	Negative.	....	....	....	Sterile.	Sterile.	Negative.	Normal.
24	69	Sterile.	Sterile.	Negative.	....	....	....	Sterile.	Sterile.	Negative.	Normal.
25	70	Sterile.	Sterile.	Negative.	....	....	....	Sterile.	Sterile.	Negative.	Normal.
	51	Sterile.	Sterile.	Negative.	....	....	....	Sterile.	Sterile.	Negative.	Normal.
	20	Sterile.	Sterile.	Negative.	....	....	....	Sterile.	Sterile.	Negative.	Normal.

NORMAL CASES—CULTURES TAKEN IN THE FIRST PERIOD ONLY.

26	19	Sterile.	Sterile.	Negative.	....	....	....	....	....	....	Normal.
27	60	Sterile.	Sterile.	Negative.	....	....	....	....	....	....	Normal. Temperature febrile second and third day.
28	29	Sterile.	Sterile.	Negative.	....	....	....	....	....	....	Normal.
29	31	Sterile.	Sterile.	Negative.	....	....	....	....	....	....	Normal.
30	44	Sterile.	Sterile.	Negative.	....	....	....	....	....	....	Normal.
31	38	Sterile.	Sterile.	Negative.	....	....	....	....	....	....	Abortion at 6 months. Breech delivered—Wiegand.
32	39	Sterile.	Sterile.	Negative.	....	....	....	....	....	....	Normal.
33	64	Sterile.	Sterile.	Negative.	....	....	....	....	....	....	Prolapse of cord (no version). Otherwise normal.
34	4	Sterile.	Sterile.	Negative.	....	....	....	....	....	....	Normal.

NORMAL CASES—CULTURES TAKEN IN THE SECOND AND THIRD PERIODS.

35	10	....	....	....	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Tuberculosis. Irregular febrile temperature.
36	16	....	....	....	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Normal.
	55	....	....	....	Sterile.	Sterile.	Negative.	See error in technique.			Normal.

NORMAL CASES—CULTURES TAKEN IN THE SECOND PERIOD ONLY.

Number.	Case number.	First period: First to third day.			Second period: Fourth to seventh day.			Third period: Eighth to thirteenth day.			Remarks.
		Aërobic.	Anaërobic.	Microscopic.	Aërobic.	Anaërobic.	Microscopic.	Aërobic.	Anaërobic.	Microscopic.	
37	47	....	....	....	Sterile.	Sterile.	Negative.	....	....	....	Normal.
38	48	....	....	....	Sterile.	Sterile.	Negative.	....	....	....	Normal.
30	40	....	....	....	Sterile.	Sterile.	Negative.	....	....	....	Normal.
40	53	....	....	....	Sterile.	Sterile.	Negative.	....	....	....	Slight phlegmasia.
41	37	....	....	....	Sterile.	Sterile.	Negative.	....	....	....	Normal. Temperature once 101.2°
43	52	....	....	....	Sterile.	Sterile.	Negative.	....	....	....	Normal.
43	60	....	....	....	Sterile.	Sterile.	Negative.	....	....	....	Normal.

NORMAL CASES—ERRORS IN TECHNIQUE WITH POSITIVE FINDINGS.

Number.	Case number.	First period: Aërobic.	First period: Anaërobic.	First period: Microscopic.	Second period: Aërobic.	Second period: Anaërobic.	Second period: Microscopic.	Third period: Aërobic.	Third period: Anaërobic.	Third period: Microscopic.	Remarks.
44	34	Mic. pyog. aur., Bac. xeroides, Mic. magnus.	No obligatory anaërobe.	Gram positive micrococci, and bacilli.	See normal cases: Cultures taken in first, second, and third periods.						The first culture was taken as a demonstration. The tube became blocked and was accidentally withdrawn and vaginal secretion inspirated.
45	20	See normal cases: Cultures taken in first and third periods.			....	....	....	Mic. pyog. alb.	No obligatory anaërobe.	Gram positive micrococci.	On last culture, tube was introduced without speculum. This growth considered vaginal or cervical contamination.
46	51	See normal cases: Cultures taken in first and third periods.			....	....	....	Mic. pyog. aur.	No obligatory anaërobe.	Gram positive micrococci.	The last culture was taken by resident physician and mistake in technique was made.
47	24	Streptococcus, Bac. coli com.	No obligatory anaërobe.	Gram positive micrococci. Gram negative bacilli.	....	....	....	....	....	....	Attempt to pass tube failing, it was withdrawn and passed by the aid of vaginal touch. Case normal clinically.
48	54	....	....	....	Mic. pyog. alb.	No obligatory anaërobe.	Gram positive micrococci.	....	....	....	Tube boiled and passed without speculum.
40	55	....	....	....	....	....	....	Mic. pyog. alb. bac.	No obligatory anaërobe.	Gram positive micrococci.	Tube passed without speculum; cervix not cleansed; cap opened in vagina.

ABNORMAL CASES OBSTETRICALLY—FORCEPS.

50	45	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	....	....	....	Low Sawyer forceps.
51	18	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	....	....	....	Simpson forceps. Slight fever on third day.
52	63	Sterile.	Sterile.	Negative.	....	....	....	Sterile.	Sterile.	Negative.	Simpson forceps. Bad cervical tear. Much clotted blood in vagina at first examination. Vaginal discharge foul. Intra-uterine douche several times before last culture. Leukocytes, 14,000. Blood culture, negative
53	40	Sterile.	Sterile.	Negative.	....	....	....	....	....	....	Low forceps. Temperature never febrile.
54	60	....	....	....	Sterile.	Sterile.	Negative.	....	....	....	Simpson forceps. Temperature never febrile.

ABNORMAL CASES OBSTETRICALLY—DOUCHES; MANUAL REMOVAL OF THE PLACENTA; VERSION; INTRA-UTERINE PACK

55	23	Sterile.	Sterile.	Negative.	....	....	....	Sterile.	Sterile.	Negative.	Temperature never febrile. Intra-uterine douche before cultures.
56	17	Mic. pyog. alb.	No obligatory anaërobe.	Gram positive micrococci.	....	....	....	Sterile.	Sterile.	Negative.	Adherent placenta. Manual removal. Normal temperature.
57	35	....	....	....	Sterile.	Sterile.	Negative.	Sterile.	Sterile.	Negative.	Placenta previa with version. Gauze pack. Irregular fever. Lochia foul. Complete tear. Child macerated. Blood culture negative.
58	40	....	....	....	Sterile.	Sterile.	Negative.	....	....	....	Intra-uterine pack.

ABNORMAL CASES OBSTETRICALLY—CRANIOTOMY.

59	30	Mic. pyog. alb., Bact. coli com.	No obligatory anaërobe.	Gram positive micrococci. Gram negative bacilli.	Mic. pyog. alb. Bact. coli com.	No obligatory anaërobe.	Gram positive micrococci. Gram negative bacilli.	....	....	....	Never febrile. Craniotomy. Fetid discharge. Probable muscular rupture of uterine wall.
60	11	....	....	...	Mic. magnus. Mic. pyog. aur.	No obligatory anaërobe.	Gram positive micrococci.	....	....	....	Craniotomy for hydrocephalus Normal temperature.

INTERCURRENT DISEASE—TYPHOID FEVER

Number.	Case number.	First period: First to third day.			Second period: Fourth to seventh day.			Third period: Eighth to thirteenth day.			Remarks.
		Aërobic.	Anaërobic.	Microscopic.	Aërobic.	Anaërobic.	Microscopic.	Aërobic.	Anaërobic.	Microscopic.	
61	33	....	....	....	....	....	....	Sterile.	Sterile.	Negative.	Douche before admission. Blood culture. Bac. typhosus.
GONORRHŒAL CASES.											
62	12	Mic. pyog. aur.	No obligatory anaërobe.	Gram positive micrococci. Gonococci.	Mic. pyog. aur.	No obligatory anaërobe.	Gram positive micrococci. Gonococci.	....	....	....	Child developed ophthalmia neonatorum. Never febrile.
63	26	Sterile.	Sterile.	Gonococci.	....	....	....	Sterile.	Sterile.	Gonococci.	Douche before second culture. Febrile after first culture. Diagnosis: Gonorrheal rheumatism and breast abscess.
64	67	Streptococcus.	No obligatory anaërobe.	Gram positive micrococci. Gonococci.	Sterile.	Sterile.	Negative.	....	....	....	Normal temperature.
SEPTIC CASES.											
65	3	Sterile.	Sterile.	Negative.	Streptococci	No obligatory anaërobe.	Gram positive micrococci.	....	....	....	Blood culture showed streptococcus pyogenes. Febrile third to fourteenth day. Breast congested. Many intra-uterine douches.
66	68	Streptococcus.	No obligatory anaërobe.	Gram positive micrococci. Gonococci.	Streptococci	No obligatory anaërobe.	Gram positive micrococci. Gonococci.	....	....	....	Febrile 3 days. Manual extraction placenta. Purulent cervical discharge. Diagnosis puerperal endometritis.
67	21	....	....	....	....	....	....	Streptococcus.	....	Gram positive micrococci.	Blood culture: Steptococcus pyogenes.

To consider these 6 cases from the standpoint of actual the error occurring in each case:

CASE XXXIV.—The first culture showed Micrococcus aureus and magnus and Bacillus xeroides. The case was used for demonstration, the tube accidentally slipping, whereby vaginal secretion was inspirated.

CASE XX.—First culture sterile; second culture gave Micrococcus albus. Here the variation consisted in the omission of the Sim's speculum in the introduction of the tube, it being guided into the cervix by the finger in the vagina.

CASE LI.—In this case the first culture was sterile, while the second, taken by an assistant, showed a growth, Micrococcus aureus. In both instances the variation in technique was identical, the vaginal speculum being omitted. From our knowledge of the ease of contamination, we consider that this second culture was contaminated by lack of care upon the part of a man inexperienced in the method. We admit that this contention is not proved.

CASE XXIV.—But one culture was made, and this gave the streptococcus and the colon bacillus. In this instance the Sim's speculum prevented sufficient depression of the tube to enable it to pass, so the former was discarded and the tube was passed by guidance of the finger. During the short time elapsing between the introductions, the tubes were both placed in the instrument tray, which was an additional source of possible infection.

CASE LIV.—Tube was introduced by guidance of a finger in the vagina. In addition, the tube was sterilized by boiling instead of by pressure.

CASE LV.—Tube was introduced, as in the last case, and, in addition, the cap of the metal tube opened while it was in the vagina during the introduction.

It is to be noticed that the omission of the Sim's speculum was noted in each instance in which in a normal case a growth was recorded. In two instances there were other factors present which would have been sufficient to cause contamination—in one case the protective cup was open during introduction, while in the other both tubes lay for several minutes in an instrument tray the sterility of which during that period must be considered doubtful.

Because of difficulties inherent to the work it was not possible, and, indeed, it did not seem desirable, to culture each case upon the same day of the puerperium, so we have divided the cultures into three periods. We have further divided the whole list of cases under various headings, as follows:

A. Clinically normal cases:

1. Cultures during first period (first to third day), 34 in number; all sterile.
2. Cultures during second period (fourth to seventh day), 29 in number; all sterile.

3. Cultures during the third period (eighth to thirteenth day), 18 in number; all sterile.

B. Clinically normal cases with errors in technique and positive results:

1. Cultures during first period, 2 in number.
2. Cultures during second period, 1 in number.
3. Cultures during third period, 3 in number.

(All of these cases, with one exception, in which but one culture was taken, showed negative results from other cultures made without error.)

C. Clinically abnormal cases:

- (*a*) Forceps (in excavation or at outlet), 5 cases.
    1. Cultures during first period, 4 in number; all sterile.
    2. Cultures during second period, 3 in number; all sterile.
    3. Cultures during third period, 1 in number; all sterile.
- (*b*) Douches (intra-uterine), 1 case:
    1. Cultures during first period, 1 in number; sterile.
    2. Cultures during third period, 1 in number; sterile.
- (*c*) Manual removal of placenta, 1 case.
    1. Cultures during first period, 1 in number; growth.
    2. Cultures during third period, 1 in number; sterile.
- (*d*) Craniotomy, 2 cases:
    1. Cultures during first period, 1 in number; growth.
    2. Cultures during second period, 2 in number; growth.
- (*e*) Version for placenta prævia (macerated fœtus):
    1. Cultures during second period, 1 in number; sterile.
    2. Cultures during third period, 1 in number; sterile.
- (*f*) Uterine packing:
    1. Cultures during second period, 1 in number; sterile.

D. Intercurrent disease:

Typhoid fever (blood positive).

1. Cultures in third period, 1 in number; sterile.

E. Gonorrhœa:

1. Cultures during first period, 3 in number; all positive.
2. Cultures during second period, 2 in number; 1 positive.
3. Cultures during third period, 1 in number; positive.

One case, positive in the first and third periods, was unassociated with other organisms. In this case blood examinations were negative, but a mammary abscess and gonorrhœal rheumatism were complications.

The second case, positive in the first and second periods, was associated with Micrococcus aureus in both cultures; while the third case, positive at the first culture and associated with streptococci, was negative in the second period and also sterile at this time.

F. Septic cases (3):

1. Cultures during first period, 2 in number; positive.
2. Cultures during second period, 2 in number; positive.
3. Cultures during third period, 1 in number; positive.

(Cultures not taken of third case during first or second period.) Blood cultures were positive in 2 of the above cases, and were not taken in the third case.

GENERAL CONCLUSIONS.

1. The uterine lochia is sterile in normal cases throughout the puerperium.
2. Streptococci are never present within the cavum uteri without causing symptoms.
3. In a few instances non-pathogenic germs may be found in cultures in afebrile cases, but there is every reason to believe that their presence is really the result either of contamination during the extraction of the lochia or of their introduction during obstetric manipulation.
4. Ascendance of the gonococcus is an event of comparative rarity, though the frequency of this organism would of itself give reason to expect otherwise.
5. Infection of the endometrium is an ever present danger in culturing within a few days of delivery.
6. A study of the bacterial content of the puerperal uterus is of great importance as a subsidiary means of diagnosing septic infection following delivery.
7. As nearly as may be, a technique should be adopted which will prevent contamination during the removal of the lochia in order to avoid a vitiated result.